

REMARKS

I. Status of the Application

Claims 15, 16, 19-22, 25, 26, 28 and 34-38 are pending in this application. In the September 21, 2006 Office Action, the Examiner:

A. Rejected claims 15, 16, 19-21, and 34-38 under 35 U.S.C. § 112, second paragraph, as indefinite.

B. Rejected claims 15, 19-22, 25, 26, 34 and 36-38 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,573,776 to Miyamoto (hereinafter “Miyamoto”) in view of U.S. Patent No. 6,229,364 to Dortu et al. (hereinafter “Dortu”).

C. Rejected claims 16, 28 and 35 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Miyamoto in view of Dortu in further view of U.S. Patent No. 6,208,183 to Li et al. (hereinafter, “Li”).

In this response, applicants have amended claims 15 and 35. Applicants respectfully traverse the rejections and request reconsideration of pending claims 15, 16, 19-22, 25, 26, 28 and 34-38 in view of the foregoing amendments and the following remarks.

II. The 35 U.S.C. § 112 Rejections Should Be Withdrawn

The Examiner has rejected claims 15, 16, 19-21, and 34-38 under the first paragraph of 35 U.S.C. § 112 as indefinite. In particular, claim 15 was rejected for the limitations “a frequency detection unit having an output signal and “a frequency detection unit configured to generate the set signal.” Claim 15 has been amended to remove the second instance of the limitation of a frequency detection unit. Claim 35 was also rejected as being indefinite.

Claim 35 has been amended to show that the filtering device filters the control signal and that the first delay element is responsive to the filtered control signal. Accordingly, Applicant submits that the indefiniteness rejections of claims 15 and 35 are now moot. Similarly, because claims 16, 19-21, 34, and 36-38 were rejected as being indefinite for depending from a claims 15 or 35, Applicant submits that the indefiniteness rejections of these claims is now moot as well.

III. Independent Claims 15 and 22 are Patentable Over the Prior Art

In the April 6, 2006 Final Office Action, the Examiner rejected independent claims 15 and 22 as allegedly being unpatentable over Miyamoto in view of Dortu. For reasons discussed below in detail, it is respectfully submitted that obviousness rejection of claims 15 and 22, as amended, should be withdrawn.

A. Claim 15

Claims 15 is directed to a delay lock loop apparatus which can be adapted for use with a broad range of externally generated clock signals. The apparatus includes a delay device, a feedback device, a frequency detection device and a phase difference detection device. The delay device comprises first and second delay elements. The second delay element comprises different second delay elements for different frequency ranges. At least one second delay element is for low frequency ranges of the clock signal, and at least one further second delay element is for high frequency ranges of the clock signal, wherein the second delay element for low frequencies and the further second delay element for high frequencies are switched over for different frequency ranges of the externally generated clock signal. Thus, claim 15

requires that separate delay elements be provided for different frequency ranges that are capable of being switched over for the different frequency ranges.

1. Combination of Miyamoto and Dortu Does Not Arrive at Claim 15

The combination of Miyamoto and Dortu does not arrive at the invention of claim 15, as amended. As mentioned above, claim 15 includes the limitation that “the second delay element comprises different second delay elements in discrete steps for different frequency ranges, at least one second delay element being for low frequencies of the externally generated clock signal and at least one further second delay element being for high frequencies of the externally generated clock signal” . . . “wherein the second delay element for low frequencies and the further second delay element for high frequencies are switched over for different frequency ranges of the externally generated clock signal.” The combination of Miyamoto and Dortu fails to teach, show or suggest these limitations.

2. Miyamoto and Dortu

The Examiner cited Miyamoto as teaching all of the limitation of Applicant’s claim 15 except that the second delay element comprises a low frequency delay element for low clock frequencies and a high frequency delay element for high clock frequencies, wherein the low frequency delay element and high frequency delay element are configured for operation at different frequency ranges of the externally generated clock. (Office Action, page 4). To supply this limitation, the Examiner cited Dortu stating that “Dortu discloses in figure 9 and associated description a delay circuit 400 permitting delaying both low and high frequency ranges of an externally generated clock signal IN.”

3. Inverters of Miyamoto Do Not Constitute Different Second Delay Elements

Applicant submits that the Examiner has misconstrued the second delay element 402 of Miyamoto as satisfying the limitation of including different second delay elements for different frequency ranges. In particular, the Examiner cited the inverters 412 as shown in FIG. 12 of Miyamoto as satisfying the limitation of different delay elements for different frequency ranges. However, there is no teaching in Miyamoto of different inverters for different frequency ranges. The clock signal is sequentially transferred through each of the plurality of inverters, or delay circuits. (See Miyamoto, Abstract). Thus, in Miyamoto, the same set of inverters are for use with all frequency ranges. There is no switching over between inverters for different frequency ranges.

Moreover, the inverters of Miyamoto should not be considered delay elements as used in Applicant's specification. For instance, as described in Applicant's specification (at page 5), "in order to allow the frequency detection unit to adjust the time delay of the second delay element, the cycle time of the delay control apparatus is compared with a number ... of delay units for the second delay element. The number of delay units for the second delay element is expediently eight." The delay units of Applicant's delay elements correspond substantially to the delay circuits 412 of Miyamoto for incrementally adjusting a delay time. Thus, the second delay element of Miyamoto does not include different second delay elements for different frequency ranges.

Miyamoto discloses the use of a single second delay element for use with all frequency ranges in order to save space on an integrated circuit. For instance, Miyamoto states that what is needed by a conventional timing generation circuit is a minimal unit delay time in the respective delay circuits (elements 412, FIG. 10), and the ability to adjust the

synchronization of a clock signal having a relatively long cycle. (Miyamoto, col. 3, lines 54-58). To this end, Miyamoto discloses the use of a first delay element 402 that includes a plurality of delay circuits, or inverters 412 (shown to be eight). The inverters 412 of the delay element 402 of Miyamoto are configured to incrementally increase the delay time by a large amount. Thus, the delay element 402 of Miyamoto allegedly allows for the adjustment of the synchronization of a clock signal having a relatively long duty cycle. The delay element 403 of Miyamoto includes a plurality of inverters for increasing the delay time in minute increments, thus allowing for high resolution adjustments. There is no teaching or suggestion in Miyamoto of using different delay elements for different frequency ranges because Miyamoto uses a single delay element for the entire frequency range. The combination of large and minute adjustments allows for the use of fewer delay circuits, and, consequently, less space on a semiconductor may be used.

4. Dortu Does Not Disclose the Use of Different Delay Elements for the Different Frequencies

There is no disclosure in Dortu of the use of different delay elements for the different frequencies. In fact, Dortu teaches away from using different delay elements for different clock frequencies. For instance, Dortu states that “by altering a supply voltage to the delay elements in a delay line, delay may be adjusted without altering the elements.” (Dortu, col. 4, lines 25-28). Thus, Dortu teaches that by altering the supply voltage, the delay may be adjusted for different frequencies without having to use different elements for each frequency.

5. Conclusion

Accordingly, because the combination of Miyamoto and Dortu fails to teach, show or suggest the limitation that “the second delay element comprises different second delay elements in discrete steps for different frequency ranges, at least one second delay element being for low frequencies of the externally generated clock signal and at least one further second delay element being for high frequencies of the externally generated clock signal” . . . “wherein the second delay element for low frequencies and the further second delay element for high frequencies are switched over for different frequency ranges of the externally generated clock signal,” a prima facie case of obviousness has not been established with respect to claim 15. Therefore, Applicant respectfully submits that the obviousness rejection of claim 15 should be withdrawn.

B. Claim 22

Claim 22 has been amended to include similar limitations to claim 15. In particular, claim 22 has been amended to include the limitation that the second delay element comprises different second delay elements for different frequencies. Thus, for at least the reasons discussed above with respect to claim 15, the combination of Miyamoto and Dortu does teach, show or suggest the limitation that the second delay element comprises different second delay elements for different frequencies. Accordingly, a prima facie case of obviousness has not been established with respect to claim 22 and the rejection should be withdrawn.

IV. Dependent Claims 16, 19-21, 25, 26 and 34-38

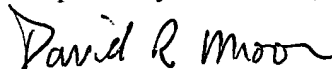
In the April 6, 2006 Final Office Action, the Examiner rejected dependent claims 16, 19-21, 25, 26, 28 and 34-38 as being allegedly being unpatentable over Miyamoto in view of Dortu or over Miyamoto in view of Dortu in further view of Li. However, claims 16, 19-21, 25, 26, 28 and 34-38 depend from and incorporate all the limitations of one of independent claims 15 or 22. As set forth above, it is respectfully submitted that independent claims 15 and 22 are allowable. Accordingly, it is also respectfully submitted that dependent claims 16, 19-21, 25, 26, 28 and 34-38 are also allowable for at least the same reasons that independent claims 15 and 22 are allowable.

V. Conclusion

Applicant respectfully requests entry of the amendment and favorable consideration of the application. A prompt and favorable action on the merits is requested.

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Respectfully Submitted,



David R. Moorman
Attorney for Applicant
Attorney Registration No. 59,323
Maginot, Moore & Beck
Chase Tower
111 Monument Circle, Suite 3250
Indianapolis, IN 46204-5109
Telephone: (317) 638-2922